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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XA808

Takes of Marine Mammals Incidental to Specified Activities; Marine Geophysical Survey in the Central Pacific Ocean, November, 2011 through January, 2012

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; issuance of an incidental take authorization.

SUMMARY: In accordance with the Marine Mammal Protection Act (MMPA) regulation, notification is hereby given that NMFS has issued an Incidental Harassment Authorization (IHA) to Lamont-Doherty Earth Observatory (L-DEO), a part of Columbia University, for an Incidental Harassment Authorization (IHA) to take marine mammals, by harassment, incidental to conducting a marine geophysical survey in the central Pacific Ocean, November, 2011 through January, 2012.

DATES: Effective November 26, 2011 through January 19, 2012.

ADDRESSES: A copy of the IHA and application are available by writing to P. Michael Payne, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910-3225.

An electronic copy of the application containing a list of the references used in this document may be obtained by writing to the above address, telephoning the contact listed here (see FOR FURTHER INFORMATION CONTACT) or visiting the internet at:

<http://www.nmfs.noaa.gov/pr/permits/incidental.htm#applications>.

The following associated documents are also available at the same internet address: the National

Science Foundation's (NSF) final Environmental Analysis (Analysis) pursuant to Executive Order 12114, which incorporates an "Environmental Assessment of a Marine Geophysical Survey by the R/V Marcus G. Langseth in the Central Pacific Ocean, November – December 2011," prepared by LGL Limited, on behalf of NSF and L-DEO; and a finding of no significant impact (FONSI) prepared by the NSF. NMFS prepared its own EA and FONSI, which is available at the same internet address. Documents cited in this notice may be viewed, by appointment, during regular business hours, at the aforementioned address.

The NMFS Biological Opinion will be available online at:

<http://www.nmfs.noaa.gov/pr/consultation/opinions.htm>.

FOR FURTHER INFORMATION CONTACT: Jeannine Cody, Office of Protected Resources, NMFS, (301) 427-8401.

#### SUPPLEMENTARY INFORMATION:

##### Background

Section 101(a)(5)(D) of the Marine Mammal Protect Act of 1972, as amended (MMPA; 16 U.S.C. 1361 et seq.) directs the Secretary of Commerce to authorize, upon request, the incidental, but not intentional, taking of small numbers of marine mammals of a species or population stock, by United States citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review.

Authorization for the incidental taking of small numbers of marine mammals shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), and will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant). The authorization must set forth the permissible methods of taking, other means of

effecting the least practicable adverse impact on the species or stock and its habitat, and requirements pertaining to the mitigation, monitoring and reporting of such takings. NMFS has defined "negligible impact" in 50 CFR 216.103 as "...an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival."

Section 101(a)(5)(D) of the MMPA established an expedited process by which citizens of the United States can apply for an authorization to incidentally take small numbers of marine mammals by harassment. Section 101(a)(5)(D) of the MMPA establishes a 45-day time limit for NMFS' review of an application followed by a 30-day public notice and comment period on any proposed authorizations for the incidental harassment of small numbers of marine mammals. Within 45 days of the close of the public comment period, NMFS must either issue or deny the authorization. NMFS must publish a notice in the Federal Register within 30 days of its determination to issue or deny the authorization.

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as:

any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment].

#### Summary of Request

NMFS received an application on June 17, 2011, from L-DEO for the taking by harassment, of marine mammals, incidental to conducting a marine geophysical survey in the central tropical Pacific Ocean in international waters. L-DEO, with research funding from the U.S. National Science Foundation (NSF), plans to conduct the survey from November 26, 2011, through December 29, 2011. Upon receipt of additional information, NMFS determined the application complete and

adequate on August 26, 2011. NMFS made the complete application available for public comment (see ADDRESSES) for this IHA.

L-DEO plans to use one source vessel, the R/V Marcus G. Langseth (Langseth) and a seismic airgun array to image the structure of the oceanic lithosphere (i.e., the Earth's crust and the uppermost mantle) in the Central Pacific using three-dimensional (3-D) seismic reflection techniques. The Langseth would deploy a single hydrophone streamer and approximately 34 short-period Ocean Bottom Seismometers (OBS) to collect geophysical data. After completion of the seismic survey, the Langseth will recover the 34 seismometers and deploy 27 broad-band OBSs and five magneto-telluric instruments on the seafloor. These instruments will remain on the seafloor for 12 months and the scientists will recover these instruments in 2012.

In addition to the operations of the seismic airgun array, L-DEO intends to operate a multibeam echosounder (MBES) and a sub-bottom profiler (SBP) continuously throughout the survey.

Acoustic stimuli (i.e., increased underwater sound) generated during the operation of the seismic airgun array, may have the potential to cause a short-term behavioral disturbance for marine mammals in the survey area. This is the principal means of marine mammal taking associated with these activities and L-DEO has requested an authorization to take 20 species of marine mammals by Level B harassment. Take is not expected to result from the use of the MBES, the SBP, the OBSs, or the magneto-telluric instruments for reasons discussed in this notice. Also, NMFS does not expect take to result from collision with the Langseth because it is a single vessel moving at relatively slow speeds during seismic acquisition within the survey, for a relatively short period of time. It is likely that any marine mammal would be able to avoid the vessel.

#### Description of the Specified Activity

L-DEO's seismic survey is scheduled to commence on November 26, 2011, and continue for

approximately 35 days ending on December 29, 2011. Some minor deviation from these dates is possible, depending on logistics, weather conditions, and the need to repeat some lines if data quality is substandard. Therefore, NMFS proposes to issue an authorization that extends to January 19, 2012.

Within this time period, the Langseth will conduct seismic operations deploying a 36-airgun array, a 6-kilometer (km) hydrophone streamer, and 34 OBSs. The Langseth will depart from Honolulu, Hawai'i on November 26, 2011 and transit to the survey area in the central Pacific Ocean, approximately 1,300 km (808 mi) south of Hawai'i.

Geophysical survey activities will involve 3-D seismic methodologies to define the detailed structure of the oceanic lithosphere and to develop a comprehensive theory on its formation and evolution. To obtain 3-D images of the lithosphere in the survey area, the Langseth will deploy a 36-airgun array as an energy source. The receiving system consists of one 6-km-long hydrophone streamer and approximately 34 OBSs. As the airgun array is towed along the survey lines, the hydrophone streamers will receive the returning acoustic signals and transfer the data to the on-board processing system. The OBSs will receive the returning acoustic signals and record them internally for later analysis after retrieval from the seafloor.

The study (e.g., equipment testing, startup, line changes, repeat coverage of any areas, and equipment recovery) will take place in water depths of approximately 5,000 meters (m) (3.1 mi). The survey will require approximately 11 days (d) to complete approximately 2,120 km (1,317.3 mi) of transect lines. The Langseth will shoot a 600-km long transect line twice; once using the hydrophone streamer as the receiver and once again using the OBSs. Subsequent seismic operations will occur along two semi-circular arcs (180 degrees) centered at the mid-point of the 600-km long transect line with radii of 50 and 150 km, respectively. The Langseth will conduct additional

seismic operations in the survey area associated with turns, airgun testing, and repeat coverage of any areas where the initial data quality is sub-standard. Data acquisition will include approximately 264 hours (hr) of airgun operation (11 d x 24 hr).

The scientific team for this survey consists of Drs. J.B. Gaherty (L-DEO); D. Lizarralde, J.A. Collins, and R. Evans (Woods Hole Oceanographic Institution); and G. Hirth (Brown University).

NMFS expects that acoustic stimuli resulting from the operation of the single airgun or the 36-airgun array has the potential to harass marine mammals, incidental to the conduct of the seismic survey. NMFS expects these disturbances to be temporary and result in a temporary modification in behavior and/or low-level physiological effects (Level B harassment only) of small numbers of certain species of marine mammals. NMFS does not expect that the movement of the Langseth, during the conduct of the seismic survey, has the potential to harass marine mammals because of the relatively slow operation speed of the vessel (4.6 kts; 8.5 km/hr; 5.3 mph) during seismic acquisition.

NMFS outlined the purpose of the program in a previous notice for the proposed IHA (76 FR 57959, September 19, 2011). The activities to be conducted have not changed between the proposed IHA notice and this final notice announcing the issuance of the IHA. For a more detailed description of the authorized action, including vessel and acoustic source specifications, the reader should refer to the proposed IHA notice (76 FR 57959, September 19, 2011), the application and associated documents referenced above this section.

#### Description of the Specified Geographic Region

The survey will encompass the area bounded by 7-12° N and 148-142° W in international waters in the central Pacific Ocean (see Figure 1 in L-DEO's application). Water depth in the survey area is approximately 5,000 m (3.1 mi).

## Comments and Responses

A notice of receipt of the L-DEO application and proposed IHA was published in the Federal Register on September 19, 2011 (76 FR 57959). During the 30-day public comment period, NMFS received comments from the Marine Mammal Commission (Commission) only. The Commission's comments are online at: <http://www.nmfs.noaa.gov/pr/permits/incidental.htm>. Following are their comments and NMFS' responses.

Comment 1: The Commission recommends that the NMFS require L-DEO to re-estimate the proposed exclusion (EZs) and buffer zones and associated takes of marine mammals using site-specific information.

Response: The Langseth will conduct the survey in water depths where site-specific source signature requirements are neither warranted nor practical. Site signature measurements are normally conducted commercially by shooting a test pattern over an ocean bottom instrument in shallow water. This method is neither practical nor valid in water depths as great as 3,000 m (9,842.5 ft). The alternative method of conducting site-specific attenuation measurements would require a second vessel, which is impractical both logistically and financially. Sound propagation varies noticeably less between deep water sites than between shallow water sites (because of the reduced significance of bottom interaction), thus decreasing the importance of site-specific estimates.

Based on these reasons, and the information provided by USGS in their application and environmental analysis, NMFS is satisfied that the data supplied are sufficient for NMFS to conduct its analysis and make any determinations and therefore no further effort is needed by the applicant. While exposures of marine mammals to acoustic stimuli are difficult to estimate, NMFS is confident that the levels of take provided by L-DEO in their IHA application and EA, and authorized herein

are estimated based upon the best available scientific information and estimation methodology. The 160 dB zone used to estimate exposure is appropriate and sufficient for purposes of supporting NMFS's analysis and determinations required under section 101(a)(5)(D) of the MMPA and its implementing regulations. See NMFS's response to Comment 2 (below) for additional details.

Comment 2: The Commission recommends that NMFS require L-DEO, if the exclusion zones (EZ) and buffer zones and takes are not re-estimated, to provide a detailed justification: (1) For basing the EZs and buffer zones for the proposed survey in the central Pacific Ocean on empirical data collected in the Gulf of Mexico (GOM) or on modeling that relies on measurements from the GOM; and (2) that explains why simple ratios were used to adjust for tow depth and median values were applied to intermediate water depths rather than using empirical measurements.

Response: Appendix A in the environmental analysis includes information from the calibration study conducted on the Langseth in 2007 and 2008. This information is now available in the final environmental assessment on NSF's website at <http://www.nsf.gov/geo/occe/envcomp/index.jsp>. The revised Appendix A describes the modeling process and compares the model results with empirical results of the 2007 to 2008 Langseth calibration experiment in shallow, intermediate, and deep water. The conclusions identified in Appendix A show that the model represents the actual produced levels, particularly within the first few kilometers, where the predicted exclusion zones (EZs, i.e., safety radii) lie. At greater distances, local oceanographic variations begin to take effect, and the model tends to over predict. Further, since the modeling matches the observed measurement data, the authors have concluded that the models can continue to be used for defining EZs, including for predicting mitigation radii for various tow depths. The data results from the studies were peer reviewed and the calibration results, viewed as conservative, were used to determine the cruise-specific EZs.



At present, the L-DEO model does not account for site-specific environmental conditions. The calibration study of the L-DEO model predicted that using site-specific information may actually provide less conservative EZ radii at greater distances. The Draft Programmatic Environmental Impact Statement for Marine Seismic Research Funded by the National Science Foundation or Conducted by the U.S. Geological Survey (DPEIS) prepared pursuant to the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 et seq.) did incorporate various site-specific environmental conditions in the modeling of the Detailed Analysis Areas.

The IHA issued to L-DEO, under section 101(a)(5)(D) of the MMPA provides monitoring and mitigation requirements that will protect marine mammals from injury, serious injury, or mortality. USGS is required to comply with the IHA's requirements. These analyses are supported by extensive scientific research and data. NMFS is confident in the peer-reviewed results of the L-DEO seismic calibration studies which, although viewed as conservative, are used to determine cruise-specific EZs and which factor into exposure estimates. NMFS has determined that these reviews are the best scientific data available for review of the IHA application and to support the necessary analyses and determinations under the MMPA, Endangered Species Act (ESA; 16 U.S.C. 1531 et seq.) and NEPA.

Based on NMFS's analysis of the likely effects of the specified activity on marine mammals and their habitat, NMFS has determined that the EZs identified in the IHA are appropriate for the survey and that additional field measurement is not necessary at this time. While exposures of marine mammals to acoustic stimuli are difficult to estimate, NMFS is confident that the levels of take authorized have been estimated based upon the best available scientific information and estimation methodology. The 160-dB zone used to estimate exposure is appropriate and sufficient for purposes of supporting NMFS's analysis and determinations required under section 101(a)(5)(D) of the

MMPA and its implementing regulations.

Comment 3: The Commission recommends that NMFS require that L-DEO use species-specific maximum densities rather than best densities to re-estimate the anticipated number of takes.

Response: For purposes of this IHA, NMFS is using the best (i.e., average or mean) densities to estimate the number of authorized takes for L-DEO's seismic survey in the central Pacific Ocean as NMFS is confident in the assumptions and calculations used to estimate density for this survey area. NMFS makes decisions on whether to use maximum or best densities on a case-by-case basis, depending on the nature and robustness of existing data. Contrary to the Commission's comment in their October 19, 2011 letter to NMFS on the proposed IHA, NMFS has used best densities to estimate the number of incidental takes in IHAs for several seismic surveys in the past. The results of the associated monitoring reports show that the use of the best estimates is appropriate for and does not refute NMFS's determinations.

Comment 4: The Commission recommends that if NMFS is planning to allow the applicant to resume full power after eight minutes (min) under certain circumstances, specify in the authorization in all conditions under which a eight min period could be followed by a full-power resumption of the airguns.

Response: The IHA specifies the conditions under which the Langseth will resume full-power operations of the airguns. During periods of active seismic operations, there are occasions when the airguns need to be temporarily shut-down (for example due to equipment failure, maintenance, or shut-down) or a power-down is necessary (for example when a marine mammal is seen to either enter or about to enter the EZ). In these instances, should the airguns be inactive or powered-down for more than eight min, then L-DEO would follow the ramp-up procedures identified in the Mitigation section (see below) where airguns will be re-started beginning with the smallest airgun in

the array and increase in steps not to exceed 6 dB per 5 min over a total duration of approximately 30 min. NMFS and NSF believe that the eight min period in question is an appropriate minimum amount of time to pass after which a ramp-up process should be followed. In these instances, should it be possible for the airguns to be re-activated without exceeding the eight min period (for example equipment is fixed or a marine mammal is visually observed to have left the EZ for the full source level), then the airguns would be reactivated to the full operating source level identified for the survey (in this case, 6,600 in<sup>3</sup>) without need for initiating ramp-up procedures. In the event a marine mammal enters the EZ and a power-down is initiated, and the marine mammal is not visually observed to have left the EZ, then L-DEO must wait 15 min (for species with shorter dive durations – small odontocetes and pinnipeds) or 30 min (for species with longer dive durations – mysticetes and large odontocetes) after the last sighting before initiating a 30-min ramp-up. However, ramp-up will not occur as long as a marine mammal is detected within the EZ, which provides more time for animals to leave the EZ, and accounts for the position, swim speed, and heading of marine mammals within the EZ.

Comment 5: The Commission recommends that NMFS extend the 30 min period following a marine mammal sighting in the EZ to cover the full dive times of all species likely to be encountered.

Response: NMFS recognizes that several species of deep-diving cetaceans are capable of remaining underwater for more than 30 min (e.g., sperm whales and several types of beaked whales); however, for the following reasons NMFS believes that 30 min is an adequate length of the monitoring period prior to the ramp-up of airguns:

(1) Because the Langseth is required to monitor before ramp-up of the airgun array, the time of monitoring prior to the start-up of any but the smallest array is effectively longer than 30 min (ramp-

up will begin with the smallest airgun in the array and airguns will be added in sequence such that the source level of the array will increase in steps not exceeding approximately 6 dB per 5-min period over a total duration of 20 to 30 min;

(2) In many cases PSVOs are observing during times when L-DEO is not operating the seismic airguns and would observe the area prior to the 30 min observation period;

(3) The majority of the species that may be exposed do not stay underwater more than 30 min; and

(4) All else being equal and if deep-diving individuals happened to be in the area in the short time immediately prior to the pre-ramp up monitoring, if an animal's maximum underwater dive time is 45 min, then there is only a one in three chance that the last random surfacing would occur prior to the beginning of the required 30 min monitoring period and that the animal would not be seen during that 30 min period.

Finally, seismic vessels are moving continuously (because of the long, towed array and streamer) and NMFS believes that unless the animal submerges and follows at the speed of the vessel (highly unlikely, especially when considering that a significant part of their movement is vertical [deep-diving]), the vessel will be far beyond the length of the EZ within 30 min, and therefore it will be safe to start the airguns again.

Under the MMPA, incidental take authorizations must include means of effecting the least practicable adverse impact on marine mammal species and their habitat. Monitoring and mitigation measures are designed to comply with this requirement. NMFS believes that the framework for visual monitoring will: (1) be effective at spotting almost all species for which take is requested; and (2) that imposing additional requirements, such as those suggested by the Commission, would not meaningfully increase the effectiveness of observing marine mammals approaching or entering

the EZs and thus further minimize the potential for take.

Comment 6: The Commission recommends that NMFS, prior to granting the requested authorization, provide additional justification for its preliminary determination that the proposed monitoring program will be sufficient to detect, with a high level of confidence, all marine mammals within or entering the identified EZs and buffer zones, including:

- (1) Identifying those species that it believes can be detected with a high degree of confidence using visual monitoring only;
- (2) Describing detection probability as a function of distance from the vessel;
- (3) Describing changes in detection probability under various sea state and weather conditions and light levels; and
- (4) Explaining how close to the vessel marine mammals must be for Protected Species Observers (PSOs) to achieve high nighttime detection rates.

Response: NMFS believes that the planned monitoring program will be sufficient to detect (using visual monitoring and passive acoustic monitoring (PAM)), with reasonable certainty, marine mammals within or entering identified EZs. This monitoring, along with the required mitigation measures, will result in the least practicable adverse impact on the affected species or stocks and will result in a negligible impact on the affected species or stocks of marine mammals. Also, NMFS expects some animals to avoid areas around the airgun array ensounded at the level of the EZ.

NMFS acknowledges that the detection probability for certain species of marine mammals varies depending on animal's size and behavior as well as sea state and weather conditions and light levels. The detectability of marine mammals likely decreases in low light (i.e., darkness), higher Beaufort sea states and wind conditions, and poor weather (e.g., fog and/or rain). However, at present, NMFS views the combination of visual monitoring and PAM as the most effective monitoring and

mitigation techniques available for detecting marine mammals within or entering the EZ. The final monitoring and mitigation measures are the most effective feasible measures and NMFS is not aware of any additional measures which could meaningfully increase the likelihood of detecting marine mammals in and around the EZ. Further, public comment has not revealed any additional monitoring or mitigation measures that could be feasibly implemented to increase the effectiveness of detection.

NSF and L-DEO are receptive to incorporating proven technologies and techniques to enhance the current monitoring and mitigation program. Until proven technological advances are made, nighttime mitigation measures during operations include combinations of the use of PSVOs for ramp-ups, PAM, night vision devices (NVDs), and continuous shooting of a mitigation airgun. Should the airgun array be powered-down, the operation of a single airgun would continue to serve as a sound source deterrent to marine mammals. In the event of a complete shut-down of the airgun array at night for mitigation or repairs, L-DEO suspends the data collection until one-half hour after nautical twilight-dawn (when PSVO's are able to clear the EZ). L-DEO will not activate the airguns until the entire EZ is visible for at least 30 min.

In cooperation with NMFS, L-DEO will be conducting efficacy experiments of NVDs during a future Langseth cruise. In addition, in response to a recommendation from NMFS, L-DEO is evaluating the use of handheld forward-looking thermal imaging cameras to supplement nighttime monitoring and mitigation practices. During other low power seismic and seafloor mapping surveys, L-DEO successfully used these devices while conducting nighttime seismic operations.

Comment 7: The Commission recommends that NMFS consult with the funding agency (i.e., NSF) and individual applicants (e.g., L-DEO and U.S. Geological Survey (USGS)) to develop, validate, and implement a monitoring program that provides a scientifically sound, reasonably

accurate assessment of the types of marine mammal taking and number of marine mammals taken.

Response: Numerous studies have reported on the abundance and distribution of marine mammals inhabiting the central and eastern tropical Pacific Ocean, which overlaps with the seismic survey area, and L-DEO has incorporated this data into their analyses used to predict marine mammal take in their application. NMFS believes that L-DEO's current approach for estimating abundance in the survey area (prior to the survey) is the best available approach.

There will be significant amounts of transit time during the cruise, and PSVOs will be on watch prior to and after the seismic portions of the survey, in addition to during the survey. The collection of this visual observational data by PSVOs may contribute to baseline data on marine mammals (presence/absence) and provide some generalized support for estimated take numbers, but it is unlikely that the information gathered from this single cruise alone would result in any statistically robust conclusions for any particular species because of the small number of animals typically observed.

NMFS acknowledges the Commission's recommendations and is open to further coordination with the Commission, NSF (the vessel owner), and L-DEO (the ship operator on behalf of NSF), to develop, validate, and implement a monitoring program that will provide or contribute towards a more scientifically sound and reasonably accurate assessment of the types of marine mammal taking and the number of marine mammals taken. However, the cruise's primary focus is marine geophysical research and the survey may be operationally limited due to considerations such as location, time, fuel, services, and other resources.

Comment 8: The Commission recommends that NMFS require the applicant to:

(1) Report on the number of marine mammals that were detected acoustically and for which a power-down or shut-down of the airguns was initiated;

(2) Specify if such animals also were detected visually; and

(3) Compare the results from the two monitoring methods (visual versus acoustic) to help identify their respective strengths and weaknesses.

Response: The IHA requires that PSAOs on the Langseth do and record the following when a marine mammal is detected by the PAM:

(i) Notify the on-duty PSVO(s) immediately of a vocalizing marine mammal so a power-down or shut-down can be initiated, if required;

(ii) Enter the information regarding the vocalization into a database. The data to be entered include an acoustic encounter identification number, whether it was linked with a visual sighting, date, time when first and last heard and whenever any additional information was recorded, position, and water depth when first detected, bearing if determinable, species or species group (e.g., unidentified dolphin, sperm whale), types and nature of sounds heard (e.g., clicks, continuous, sporadic, whistles, creaks, burst pulses, strength of signal, etc.), and any other notable information.

L-DEO reports on the number of acoustic detections made by the PAM system within the post-cruise monitoring reports as required by the IHA. The report also includes a description of any acoustic detections that were concurrent with visual sightings, which allows for a comparison of acoustic and visual detection methods for each cruise. The post-cruise monitoring reports also include the following information: the total operational effort in daylight (hrs), the total operational effort at night (hrs), the total number of hours of visual observations conducted, the total number of sightings, and the total number of hours of acoustic detections conducted.

LGL Ltd., Environmental Research Associates (LGL), a contractor for L-DEO, has processed sighting and density data, and their publications can be viewed online at:

[http://www.lgl.com/index.php?option=com\\_content&view=article&id=69&Itemid=162&lang=en](http://www.lgl.com/index.php?option=com_content&view=article&id=69&Itemid=162&lang=en).



Post-cruise monitoring reports are currently available on the NMFS's MMPA Incidental Take Program website on the NSF website (<http://www.nsf.gov/geo/oce/envcomp/index.jsp>) should there be interest in further analysis of this data by the public.

Comment 9: The Commission recommends that NMFS condition the authorization to require the L-DEO to monitor, document, and report observations during all ramp-up procedures.

Response: The IHA requires that PSVOs on the Langseth make observations for 30 min prior to ramp-up, during all ramp-ups, and during all daytime seismic operations and record the following information when a marine mammal is sighted:

(i) Species, group size, age/size/sex categories (if determinable), behavior when first sighted and after initial sighting, heading (if consistent), bearing and distance from seismic vessel, sighting cue, apparent reaction of the airguns or vessel (e.g., none, avoidance, approach, paralleling, etc., and including responses to ramp-up), and behavioral pace; and

(ii) Time, location, heading, speed, activity of the vessel (including number of airguns operating and whether in state of ramp-up or power-down), Beaufort wind force and sea state, visibility, and sun glare.

Comment 10: The Commission recommends that NMFS work with NSF to analyze these monitoring data to help determine the effectiveness of ramp-up procedures as a mitigation measure for geophysical surveys after the data are compiled and quality control measures have been completed.

Response: One of the primary purposes of monitoring is to result in “increased knowledge of the species” and the effectiveness of monitoring and mitigation measures; the effectiveness of ramp-up as a mitigation measure and marine mammal reaction to ramp-up would be useful information in this regard. NMFS has asked NSF and L-DEO to gather all data that could potentially provide

information regarding the effectiveness of ramp-ups as a mitigation measure. However, considering the low numbers of marine mammal sightings and low numbers of ramp-ups, it is unlikely that the information will result in any statistically robust conclusions for this particular seismic survey. Over the long term, these requirements may provide information regarding the effectiveness of ramp-up as a mitigation measure, provided animals are detected during ramp-up.

#### Description of the Marine Mammals in the Area of the Specified Activity

Twenty-six marine mammal species may occur in the survey area, including 19 odontocetes (toothed cetaceans), 6 mysticetes (baleen whales) and one species of pinniped during November through January. Six of these species are listed as endangered under the ESA, including the humpback (Megaptera novaeangliae), sei (Balaenoptera borealis), fin (Balaenoptera physalus), blue (Balaenoptera musculus), and sperm (Physeter macrocephalus) whale and the Hawaiian monk seal (Monachus schauinslandi).

Based on available data, it is unlikely that six out of the 26 marine mammal species would occur in the survey area, including the: humpback, minke (Balaenoptera acutorostrata), fin, pygmy killer (Feresa attenuata), pygmy sperm (Kogia breviceps), or sei whale and the Hawaiian monk seal. Hawaiian monk seals have the potential to transit in the vicinity of the seismic survey, although any occurrence would be rare as they are vagrants to the area. Based on available data, L-DEO does not expect to encounter Hawaiian monk seals within the survey area and does not present analysis for these species. Accordingly, NMFS did not consider this pinniped species in greater detail. The species of marine mammals expected to be most common in the survey area (all delphinids) include the pantropical spotted dolphin (Stenella attenuata) and spinner dolphin (Stenella longirostris).

NMFS has presented a more detailed discussion of the status of these stocks and their occurrence in the central Pacific Ocean in the notice of the proposed IHA (76 FR 57959, September 19, 2011).

## Potential Effects on Marine Mammals

Acoustic stimuli generated by the operation of the airguns, which introduce sound into the marine environment, may have the potential to cause Level B harassment of marine mammals in the survey area. The effects of sounds from airgun operations might include one or more of the following: tolerance, masking of natural sounds, behavioral disturbance, temporary or permanent impairment, or non-auditory physical or physiological effects (Richardson et al., 1995; Gordon et al., 2004; Nowacek et al., 2007; Southall et al., 2007).

Permanent hearing impairment, in the unlikely event that it occurred, would constitute injury, but temporary threshold shift (TTS) is not an injury (Southall et al., 2007). Although the possibility cannot be entirely excluded, it is unlikely that the project would result in any cases of temporary or permanent hearing impairment, or any significant non-auditory physical or physiological effects. Based on the available data and studies described here, some behavioral disturbance is expected, but NMFS expects the disturbance to be localized and short-term.

The notice of the proposed IHA (76 FR 57959, September 19, 2011) included a discussion of the effects of sounds from airguns on mysticetes and odontocetes including tolerance, masking, behavioral disturbance, hearing impairment, and other non-auditory physical effects. NMFS refers the reader to L-DEO's application, environmental analysis and NMFS' EA for additional information on the behavioral reactions (or lack thereof) by all types of marine mammals to seismic vessels.

## Anticipated Effects on Marine Mammal Habitat

NMFS included a detailed discussion of the potential effects of this action on marine mammal habitat, including physiological and behavioral effects on marine fish and invertebrates in the notice of the proposed IHA (76 FR 57959, September 19, 2011). While NMFS anticipates that the

specified activity may result in marine mammals avoiding certain areas due to temporary ensonification, this impact to habitat is temporary and reversible which NMFS considered in further detail in the notice of the proposed IHA (76 FR 57959, September 19, 2011) as behavioral modification. The main impact associated with the activity would be temporarily elevated noise levels and the associated direct effects on marine mammals.

#### Mitigation

In order to issue an incidental take authorization (ITA) under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable adverse impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and the availability of such species or stock for taking for certain subsistence uses.

L-DEO has based the mitigation measures described herein, to be implemented for the seismic survey, on the following:

- (1) Protocols used during previous L-DEO seismic research cruises as approved by NMFS;
- (2) Previous IHA applications and IHAs approved and authorized by NMFS; and
- (3) Recommended best practices in Richardson et al. (1995), Pierson et al. (1998), and Weir and Dolman, (2007).

To reduce the potential for disturbance from acoustic stimuli associated with the activities, L-DEO and/or its designees would implement the following mitigation measures for marine mammals:

- (1) Proposed exclusion zones (EZ);
- (2) Power-down procedures;
- (3) Shutdown procedures; and
- (4) Ramp-up procedures.

Exclusion Zones - L-DEO uses safety radii to designate EZs and to estimate take for marine mammals. Table 1 shows the distances at which two sound levels (160- and 180-dB) are expected to be received from the 36-airgun array and a single airgun. The 180-dB level shut-down criterion is applicable to cetaceans, as specified by NMFS (2000); and L-DEO used these levels to establish the EZs. If the protected species visual observer (PSVO) detects marine mammal(s) within or about to enter the appropriate EZ, the Langseth crew will immediately power down the airgun array, or perform a shut down if necessary (see Shut-down Procedures).

Table 1 summarizes the predicted distances at which sound levels (160- and 180-dB) are expected to be received from the 36-airgun array and a single airgun operating in deep water.

**Table 1.** Measured (array) or predicted (single airgun) distances to which sound levels greater than or equal to 160 and 180 dB re: 1  $\mu\text{Pa}_{\text{rms}}$  that could be received in deep water using a 36-airgun array, as well as a single airgun towed at a depth of 9 m (29.5 ft) during the survey in the central Pacific Ocean, during November, 2011 – January, 2012. [Distances are based on model results provided by L-DEO.]

Source and Volume	Water Depth	<u>Predicted RMS Distances (m)</u>	
		160 dB	180 dB
Single Bolt airgun (40 in <sup>3</sup> )	Deep (> 1,000 m)	385	40
36-Airgun Array		3,850	940

Power-down Procedures - A power-down involves decreasing the number of airguns in use such that the radius of the 180-dB zone is decreased to the extent that marine mammals are no longer in or about to enter the EZ. A power down of the airgun array can also occur when the vessel is moving from one seismic line to another. During a power-down for mitigation, L-DEO will operate one airgun. The continued operation of one airgun is intended to alert marine mammals to the presence of the seismic vessel in the area. In contrast, a shut down occurs when the Langseth suspends all airgun activity.

If the PSVO detects a marine mammal outside the EZ, which is likely to enter the EZ, L-DEO will power down the airguns before the animal enters the EZ. Likewise, if a mammal is already

within the EZ, when first detected L-DEO will power down the airguns immediately. During a power down of the airgun array, L-DEO will operate the 40-cubic inch (in<sup>3</sup>) airgun. If a marine mammal is detected within or near the smaller EZ around that single airgun (Table 1), L-DEO will shut down the airgun (see next section).

Following a power-down, L-DEO will not resume airgun activity until the marine mammal has cleared the safety zone. L-DEO will consider the animal to have cleared the EZ if

- A PSVO has visually observed the animal leave the EZ; or
- A PSVO has not sighted the animal within the EZ for 15 min for small odontocetes, or 30 min for mysticetes and large odontocetes, including sperm, pygmy sperm, dwarf sperm, and beaked whales; or
- The vessel has moved outside the EZ (e.g., if a marine mammal is sighted close to the vessel and the ship speed is 8.5 km km/h (5.3 mph), it would take the vessel approximately eight minutes to leave the vicinity of the marine mammal).

During airgun operations following a power-down (or shut-down) whose duration has exceeded the time limits specified previously, L-DEO will ramp-up the airgun array gradually (see Shut-down Procedures).

Shut-down Procedures - L-DEO will shut down the operating airgun(s) if a marine mammal is seen within or approaching the EZ for the single airgun. L-DEO will implement a shut-down:

- (1) If an animal enters the EZ of the single airgun after L-DEO has initiated a power down; or
- (2) If an animal is initially seen within the EZ of the single airgun when more than one airgun (typically the full airgun array) is operating.

L-DEO will not resume airgun activity until the marine mammal has cleared the EZ, or until the PSVO is confident that the animal has left the vicinity of the vessel. Criteria for judging that the animal has cleared the EZ will be as described in the preceding section.

Ramp-up Procedures - L-DEO will follow a ramp-up procedure when the airgun subarrays begin operating after a specified period without airgun operations or when a power down has exceeded that period. For the present cruise, this period will be approximately eight minutes. This period is based on the 180-dB radius for the 36-airgun array towed at a depth of nine m (29.5 ft) in relation to the minimum planned speed of the Langseth while shooting (8.5 km/h; 5.3 mph; 4.6 kts). L-DEO has used similar periods (8-10 min) during previous L-DEO surveys. L-DEO will not resume operations if a marine mammal has not cleared the EZ as described earlier.

Ramp-up will begin with the smallest airgun in the array (40-in<sup>3</sup>). Airguns will be added in a sequence such that the source level of the array will increase in steps not exceeding six dB per five-minute period over a total duration of approximately 30 min. During ramp-up, the PSVOs will monitor the EZ, and if he/she sights a marine mammal, L-DEO will implement a power down or shut down as though the full airgun array were operational.

If the complete EZ is not visible to the PSVO for at least 30 min prior to the start of operations in either daylight or nighttime, L-DEO will not commence the ramp-up unless at least one airgun (40-in<sup>3</sup> or similar) has been operating during the interruption of seismic survey operations. Given these provisions, it is likely that L-DEO will not ramp up the airgun array from a complete shut-down at night or in thick fog, because the outer part of the EZ for that array will not be visible during those conditions. If one airgun has operated during a power-down period, ramp-up to full power will be permissible at night or in poor visibility, on the assumption that marine mammals will be alerted to the approaching seismic vessel by the sounds from the single airgun and could move away. L-DEO

will not initiate a ramp-up of the airguns if a marine mammal is sighted within or near the applicable EZs during the day or close to the vessel at night.

NMFS carefully evaluated the applicant's proposed mitigation measures and considered a range of other measures in the context of ensuring that NMFS prescribed the means of effecting the least practicable adverse impact on the affected marine mammal species and stocks and their habitat. Our evaluation of potential measures included consideration of the following factors in relation to one another: (1) the manner in which, and the degree to which, the successful implementation of the measure is expected to minimize adverse impacts to marine mammals; (2) the proven or likely efficacy of the specific measure to minimize adverse impacts as planned; and (3) the practicability of the measure for applicant implementation.

Based on our evaluation of the applicant's proposed measures, NMFS determined that the mitigation measures provide the means of effecting the least practicable adverse impacts on marine mammals species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

#### Monitoring and Reporting

In order to issue an ITA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth "requirements pertaining to the monitoring and reporting of such taking." The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for IHAs must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the action area.

#### Monitoring



L-DEO will sponsor marine mammal monitoring during the present project, in order to implement the mitigation measures that require real-time monitoring, and to satisfy the monitoring requirements of the IHA. L-DEO's Monitoring Plan is described below this section. L-DEO understands that this monitoring plan will be subject to review by NMFS, and that refinements may be required. The monitoring work described here has been planned as a self-contained project independent of any other related monitoring projects that may be occurring simultaneously in the same regions. L-DEO is prepared to discuss coordination of its monitoring program with any related work that might be done by other groups insofar as this is practical and desirable.

#### Vessel-based Visual Monitoring

L-DEO will position PSVOs aboard the seismic source vessel to watch for marine mammals near the vessel during daytime airgun operations and during any start-ups at night. PSVOs will also watch for marine mammals near the seismic vessel for at least 30 min prior to the start of airgun operations after an extended shut down. PSVOs will conduct observations during daytime periods when the seismic system is not operating for comparison of sighting rates and behavior with and without airgun operations and between acquisition periods.

Based on PSVO observations, the Langseth will power down or shut down the airguns when marine mammals are observed within or about to enter a designated EZ. The EZ is a region in which a possibility exists of adverse effects on animal hearing or other physical effects.

During seismic operations, at least four PSVOs will be based aboard the Langseth. L-DEO will appoint the PSVOs with NMFS' concurrence. During all daytime periods, two PSVOs will be on duty from the observation tower to monitor and PSVOs will be on duty in shifts of duration no longer than four hours. During mealtimes it is sometimes difficult to have two PSVOs on effort, but

at least one PSVO will be on watch during bathroom breaks and mealtimes. Use of two simultaneous observers increases the effectiveness of detecting animals near the source vessel.

L-DEO will also instruct other crew to assist in detecting marine mammals and implementing mitigation requirements (if practical). Before the start of the seismic survey, L-DEO will give the crew additional instruction regarding how to accomplish this task.

The Langseth is a suitable platform for marine mammal observations. When stationed on the observation platform, the eye level will be approximately 21.5 m (70.5 ft) above sea level, and the observer will have a good view around the entire vessel. During daytime, the PSVOs will scan the area around the vessel systematically with reticle binoculars (e.g., 7 x 50 Fujinon), Big-eye binoculars (25 x 150), and with the naked eye. During darkness, night vision devices (NVDs) will be available (ITT F500 Series Generation 3 binocular-image intensifier or equivalent), when required. Laser range-finding binoculars (Leica LRF 1200 laser rangefinder or equivalent) will be available to assist with distance estimation. Those are useful in training observers to estimate distances visually, but are generally not useful in measuring distances to animals directly; that is done primarily with the reticles in the binoculars.

#### Passive Acoustic Monitoring

Passive Acoustic Monitoring (PAM) will complement the visual monitoring program, when practicable. Visual monitoring typically is not effective during periods of poor visibility or at night, and even with good visibility, is unable to detect marine mammals when they are below the surface or beyond visual range.

Besides the four PSVOs, an additional Protected Species Acoustic Observer (PSAO) with primary responsibility for PAM will also be aboard the vessel. L-DEO can use acoustical monitoring in addition to visual observations to improve detection, identification, and localization of

cetaceans. The acoustic monitoring will serve to alert visual observers (if on duty) when vocalizing cetaceans are detected. It is only useful when marine mammals call, but it can be effective either by day or by night, and does not depend on good visibility. It will be monitored in real time so that the visual observers can be advised when cetaceans are detected. When bearings (primary and mirror-image) to calling cetacean(s) are determined, the bearings will be relayed to the visual observer to help him/her sight the calling animal(s).

The PAM system consists of hardware (i.e., hydrophones) and software. The “wet end” of the system consists of a towed hydrophone array that is connected to the vessel by a cable. The tow cable is 250 m (820.2 ft) long, and the hydrophones are fitted in the last 10 m (32.8 ft) of cable. A depth gauge is attached to the free end of the cable, and the cable is typically towed at depths less than 20 m (65.6 ft). The array will be deployed from a winch located on the back deck. A deck cable will connect the tow cable to the electronics unit in the main computer lab where the acoustic station, signal conditioning, and processing system will be located. The acoustic signals received by the hydrophones are amplified, digitized, and then processed by the Pamguard software. The system can detect marine mammal vocalizations at frequencies up to 250 kHz.

The PSAO will monitor the towed hydrophones 24 h per day during airgun operations and during most periods when the Langseth is underway while the airguns are not operating. However, PAM may not be possible if damage occurs to both the primary and back-up hydrophone arrays during operations. The primary PAM streamer on the Langseth is a digital hydrophone streamer. Should the digital streamer fail, back-up systems should include an analog spare streamer and a hull-mounted hydrophone. Every effort would be made to have a working PAM system during the cruise. In the unlikely event that all three of these systems were to fail, L-DEO would continue science acquisition with the visual-based observer program. The PAM system is a supplementary

enhancement to the visual monitoring program. If weather conditions were to prevent the use of PAM, then conditions would also likely prevent the use of the airgun array.

The PSAO will monitor the acoustic detection system at any one time, by listening to the signals from two channels via headphones and/or speakers and watching the real-time spectrographic display for frequency ranges produced by cetaceans. PSAOs monitoring the acoustical data will be on shift for one to six hours at a time. Besides the PSAO, all PSVOs are expected to rotate through the PAM position, although the most experienced with acoustics will be on PAM duty more frequently.

When a vocalization is detected while visual observations are in progress, the PSAO on duty will contact the visual PSVO immediately, to alert him/her to the presence of cetaceans (if they have not already been seen), and to allow a power down or shut down to be initiated, if required. The information regarding the call will be entered into a database. Data entry will include an acoustic encounter identification number, whether it was linked with a visual sighting, date, time when first and last heard and whenever any additional information was recorded, position and water depth when first detected, bearing if determinable, species or species group (e.g., unidentified dolphin, sperm whale), types and nature of sounds heard (e.g., clicks, continuous, sporadic, whistles, creaks, burst pulses, strength of signal, etc.), and any other notable information. The acoustic detection can also be recorded for further analysis.

#### PSVO Data and Documentation

PSVOs will record data to estimate the numbers of marine mammals exposed to various received sound levels and to document apparent disturbance reactions or lack thereof. Data will be used to estimate numbers of animals potentially ‘taken’ by harassment (as defined in the MMPA). They will

also provide information needed to order a power down or shut down of the airguns when a marine mammal is within or near the EZ.

When a sighting is made, the following information about the sighting will be recorded:

1. Species, group size, age/size/sex categories (if determinable), behavior when first sighted and after initial sighting, heading (if consistent), bearing and distance from seismic vessel, sighting cue, apparent reaction to the airguns or vessel (e.g., none, avoidance, approach, paralleling, etc.), and behavioral pace.
2. Time, location, heading, speed, activity of the vessel, sea state, visibility, and sun glare.

The data listed under (2) will also be recorded at the start and end of each observation watch, and during a watch whenever there is a change in one or more of the variables.

All observations and power downs or shut downs will be recorded in a standardized format. Data will be entered into an electronic database. The accuracy of the data entry will be verified by computerized data validity checks as the data are entered and by subsequent manual checking of the database. These procedures will allow initial summaries of data to be prepared during and shortly after the field program, and will facilitate transfer of the data to statistical, graphical, and other programs for further processing and archiving.

Results from the vessel-based observations will provide:

1. The basis for real-time mitigation (airgun power down or shut down).
2. Information needed to estimate the number of marine mammals potentially taken by harassment, which must be reported to NMFS.
3. Data on the occurrence, distribution, and activities of marine mammals and turtles in the area where the seismic study is conducted.

4. Information to compare the distance and distribution of marine mammals and turtles relative to the source vessel at times with and without seismic activity.

5. Data on the behavior and movement patterns of marine mammals seen at times with and without seismic activity.

### Reporting

L-DEO will submit a report to NMFS and NSF within 90 days after the end of the cruise. The report will describe the operations that were conducted and sightings of marine mammals and turtles near the operations. The report will provide full documentation of methods, results, and interpretation pertaining to all monitoring. The 90-day report will summarize the dates and locations of seismic operations, and all marine mammal sightings (dates, times, locations, activities, associated seismic survey activities). The report will also include estimates of the number and nature of exposures that could result in “takes” of marine mammals by harassment or in other ways.

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the IHA (if issued), such as an injury (Level A harassment), serious injury or mortality (e.g., ship-strike, gear interaction, and/or entanglement), L-DEO shall immediately cease the specified activities and immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401 and/or by email to [Michael.Payne@noaa.gov](mailto:Michael.Payne@noaa.gov) and [ITP.Cody@noaa.gov](mailto:ITP.Cody@noaa.gov) and the Pacific Islands Regional Stranding Coordinator at 808-944-2269 ([David.Schofield@noaa.gov](mailto:David.Schofield@noaa.gov)). The report must include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Name and type of vessel involved;
- Vessel’s speed during and leading up to the incident;

- Description of the incident;
- Status of all sound source use in the 24 hours preceding the incident;
- Water depth;
- Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility);
- Description of all marine mammal observations in the 24 hours preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

Activities will not resume until NMFS is able to review the circumstances of the prohibited take.

NMFS will work with L-DEO to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. L-DEO may not resume their activities until notified by NMFS via letter, email, or telephone.

In the event that L-DEO discovers an injured or dead marine mammal, and the lead PSVO determines that the cause of the injury or death is unknown and the death is relatively recent (i.e., in less than a moderate state of decomposition as described in the next paragraph), L-DEO will immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401 and/or by email to [Michael.Payne@noaa.gov](mailto:Michael.Payne@noaa.gov) and [ITP.Cody@noaa.gov](mailto:ITP.Cody@noaa.gov) and the Pacific Islands Regional Stranding Coordinator at 808-944-2269 ([David.Schofield@noaa.gov](mailto:David.Schofield@noaa.gov)). The report must include the same information identified in the paragraph above. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with L-DEO to determine whether modifications in the activities are appropriate.

In the event that L-DEO discovers an injured or dead marine mammal, and the lead PSVO

determines that the injury or death is not associated with or related to the activities authorized in the IHA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), L-DEO will report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401 and/or by email to [Michael.Payne@noaa.gov](mailto:Michael.Payne@noaa.gov) and [ITP.Cody@noaa.gov](mailto:ITP.Cody@noaa.gov) and the Pacific Islands Regional Stranding Coordinator at 808-944-2269 ([David.Schofield@noaa.gov](mailto:David.Schofield@noaa.gov)), within 24 hours of the discovery. L-DEO will provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS.

#### Estimated Take by Incidental Harassment

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as:

any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment].

Only take by Level B harassment is authorized as a result of the marine geophysical survey in the central Pacific Ocean. Acoustic stimuli (i.e., increased underwater sound) generated during the operation of the seismic airgun array may have the potential to cause marine mammals in the survey area to be exposed to sounds at or greater than 160 dB or cause temporary, short-term changes in behavior. There is no evidence that the planned activities could result in injury, serious injury or mortality within the specified geographic area for which L-DEO seeks the IHA. Take by injury, serious injury, or mortality is thus neither anticipated nor authorized. NMFS has determined that the required mitigation and monitoring measures will minimize any potential risk for injury or mortality.

NMFS included an in-depth discussion of the methods used to calculate the densities of the marine mammals in the area of the seismic survey in a previous notice for the proposed IHA (76 FR 57959, September 19, 2011). A summary is included here.



L-DEO's estimates are based on a consideration of the number of marine mammals that could be disturbed appreciably by operations with the 36-airgun array to be used during approximately 2,120 km (1,317.3 mi) of survey lines in the central Pacific Ocean. Density data on the marine mammal species in the survey area were available from two sources: (1) the NMFS Southwest Fishery Science Center (SWFSC) habitat model (Barlow et al., 2009b); and (2) densities from the offshore stratum of the surveys of Hawaiian waters conducted in August–November 2002 (Barlow, 2006). L-DEO incorporated the models into a web-based Geographic Information System (GIS) developed by Duke University's Department of Defense Strategic Environmental Research and Development Program (SERDP) team in close collaboration with the SWFSC SERDP team (Read et al., 2009). For the cetacean species in the model, L-DEO used the GIS to obtain mean densities in the survey area, (i.e., in a rectangle bounded by 150 and 156° W and 5 and 10° N).

L-DEO's estimates of exposures to various sound levels assume that the survey would be completed. As is typical during offshore ship surveys, inclement weather and equipment malfunctions are likely to cause delays and may limit the number of useful line-kilometers of seismic operations that can be undertaken. L-DEO has included an additional 25 percent of line transects to account for mission uncertainty; accommodate turns and lines that may need to be repeated; and to follow a precautionary approach. Furthermore, any marine mammal sightings within or near the designated exclusion zones will result in the power down or shut down of seismic operations as a mitigation measure. Thus, the following estimates of the numbers of marine mammals potentially exposed to sound levels of 160 dB re: 1  $\mu$ Pa are precautionary and probably overestimate the actual numbers of marine mammals that might be involved. These estimates also assume that there will be no weather, equipment, or mitigation delays, which is highly unlikely.

L-DEO estimated the number of different individuals that may be exposed to airgun sounds with received levels greater than or equal to 160 dB re: 1  $\mu$ Pa on one or more occasions by considering the total marine area that would be within the 160-dB radius around the operating airgun array on at least one occasion and the expected density of marine mammals. The number of possible exposures (including repeated exposures of the same individuals) can be estimated by considering the total marine area that would be within the 160-dB radius around the operating airguns, including areas of overlap. In the survey, the seismic lines are parallel and in close proximity; thus individuals could be exposed on two or more occasions. The area including overlap is 1.5 times the area excluding overlap. Thus a marine mammal that stayed in the survey area during the entire survey could be exposed two times, on average. Given the pattern of the seismic lines, it is unlikely that a particular animal would stay in the area during the entire survey.

The number of different individuals potentially exposed to received levels greater than or equal to 160 re: 1  $\mu$ Pa was calculated by multiplying:

- (1) The expected species density (in this case, the mean estimate), times;
- (2) The anticipated area to be ensonified to that level during airgun operations excluding overlap, which is approximately 10,971 square kilometers ( $\text{km}^2$ ) (4,235.9 square miles ( $\text{mi}^2$ )).

The area expected to be ensonified was determined by entering the planned survey lines into a MapInfo GIS, using the GIS to identify the relevant areas by “drawing” the applicable 160-dB buffer (see Table 1) around each seismic line, and then calculating the total area within the buffers. Areas of overlap were included only once when estimating the number of individuals exposed. Applying this approach, approximately 13,714  $\text{km}^2$  (5,295  $\text{mi}^2$ ) would be within the 160-dB isopleth on one or more occasions during the survey. Because this approach does not allow for turnover in the mammal populations in the study area during the course of the survey, the actual number of

individuals exposed could be underestimated. However, the approach assumes that no cetaceans will move away from or toward the trackline as the Langseth approaches in response to increasing sound levels prior to the time the levels reach 160 dB, which will result in overestimates for those species known to avoid seismic vessels.

The total estimate of the number of individual cetaceans that could be exposed to seismic sounds with received levels greater than or equal to 160 dB re: 1  $\mu$ Pa during the survey is 5,124 (see Table 2). That total includes: eight Bryde's whales or 0.6 percent of the regional population; two blue whales (endangered under the ESA) or less than 0.01 percent of the regional population); and 41 sperm whales (also listed as endangered ) or 2.97 percent of the regional population could be exposed during the survey. In addition, 110 beaked whales (91 Cuvier's, six Longman's, 14 Longman's beaked whales, and five Mesoplodon spp.) could be exposed during the survey. Most (94.8 percent) of the cetaceans that could be potentially exposed are delphinids (e.g., spinner, pantropical spotted, and striped dolphins are estimated to be the most common species in the area) with maximum estimates ranging from five to 2,516 species exposed to levels greater than or equal to 160 dB re:1  $\mu$ Pa.

**Table 2.** Estimates of the possible numbers of marine mammals exposed to different sound levels during L-DEO's seismic survey in the central Pacific Ocean during November, 2011 through January, 2012.

Species	Estimated Number of Individuals Exposed to Sound Levels $\geq 160$ dB re: 1 $\mu$ Pa <sup>1</sup>	Approximate Percent of Regional Population <sup>2</sup>	Authorized Take Authorization
Bryde's whale	8	0.06	8
Blue whale	0	< 0.01	2 <sup>4</sup>
Sperm whale	41	0.17	41
Dwarf sperm whale	105	0.94	105
Cuvier's beaked whale	91	0.46	91
Longman's beaked whale	6	2.07	14 <sup>4</sup>
<u>Mesoplodon</u> spp. <sup>3</sup>	5	0.02	5
Rough-toothed dolphin	17	0.02	17
Bottlenose dolphin	68	0.02	68
Pantropical spotted dolphin	1,651	0.13	1,651
Spinner dolphin	2,516	0.14	2,516
Striped dolphin	226	0.02	226
Fraser's dolphin	61	0.02	182 <sup>4</sup>
Risso's dolphin	11	0.01	14 <sup>4</sup>
Melon-headed whale	18	0.04	101 <sup>4</sup>
False killer whale	1	< 0.01	9 <sup>4</sup>
Killer whale	2	0.02	5 <sup>4</sup>
Short-finned pilot whale	69	0.01	69

<sup>1</sup> Estimates are based on densities from Table 3 and an ensounded area (including 25percent contingency) of 13,714 km<sup>2</sup>.

<sup>2</sup> Regional population size estimates are from Table 3 in L-DEO's application.

<sup>3</sup> Includes unidentified, ginkgo-toothed or Blainville's beaked whales.

<sup>4</sup> Requested take authorization increased to mean group size.

## Encouraging and Coordinating Research

L-DEO and NSF will coordinate the planned marine mammal monitoring program associated with the seismic survey in the central Pacific Ocean with other parties that may have interest in the area and/or be conducting marine mammal studies in the same region during the seismic survey.

## Negligible Impact and Small Numbers Analysis and Determination

NMFS has defined "negligible impact" in 50 CFR 216.103 as "...an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival." In making a negligible impact determination, NMFS considers:

- (1) The number of anticipated mortalities;
- (2) The number and nature of anticipated injuries;
- (3) The number, nature, and intensity, and duration of Level B harassment; and
- (4) The context in which the takes occur.

As mentioned previously, NMFS estimates that 20 species of marine mammals could be potentially affected by Level B harassment over the course of the IHA. NMFS anticipates impacts to marine mammals to be in the form of Level B behavioral harassment only, due to the brief duration and sporadic nature of the survey. Certain species may have a behavioral reaction (e.g., increased swim speed, avoidance of the area, etc.) to the sound emitted during the marine seismic survey. Behavioral modifications, including temporarily vacating the area during the operation of the airgun(s), may be made by these species to avoid the resultant acoustic disturbance. However, alternate areas are available to these species.

The survey would not occur in any areas designated as critical habitat for ESA-listed species; will not adversely impact marine mammal habitat; and would not occur in known feeding grounds, breeding grounds, or nursing areas for these species.

For reasons stated previously in this document and in the proposed notice of an IHA (76 FR 57959, September 19, 2011), the specified activities associated with the survey are not likely to cause temporary threshold shift, permanent threshold shift, or other non-auditory injury, serious injury, or death to affected marine mammals because:

- (1) The likelihood that, given sufficient notice through relatively slow ship speed, marine mammals are expected to move away from a noise source that is annoying prior to its becoming potentially injurious;

(2) The potential for temporary or permanent hearing impairment is very low and would likely be avoided through the implementation of the monitoring and mitigation measures;

(3) The fact that cetaceans would have to be closer than 940 m (3,084 ft) in deep water when the 36-airgun array is in use at a 9 m (29.5 ft) tow depth from the vessel to be exposed to levels of sound believed to have even a minimal chance of causing permanent threshold shift;

(4) The fact that marine mammals would have to be closer than 3,850 m (2.4 mi) in deep water when the full array is in use at a 9 m (29.5 ft) tow depth from the vessel to be exposed to levels of sound (160 dB) believed to have even a minimal chance at causing hearing impairment; and

(5) The likelihood that marine mammal detection ability by trained observers is high at that short distance from the vessel.

Table 2 in this document outlines the number of Level B harassment takes that are anticipated as a result of the activities. Of the marine mammal species likely to occur in the survey area, six are listed as endangered under the ESA: the humpback, sei, fin, blue, and sperm whale and the Hawaiian monk seal. These species are also considered depleted under the MMPA. However, no take of endangered humpback, sei, or fin whales was requested because of the low likelihood of encountering these species during the cruise. As mentioned previously, the survey would not occur in any areas designated as critical habitat for ESA-listed species and would will not adversely impact marine mammal habitat.

For the 20 species for which take was requested, the requested take numbers are small (each, less than two and one-half percent) relative to the population size. The population estimates for the species that may potentially be taken as a result of L-DEO's seismic survey were presented earlier in this document. For reasons described earlier in this document, the maximum calculated number of individual marine mammals for each species that could potentially be taken by harassment is small

relative to the overall population sizes (0.06 percent for Bryde's whales, less than 0.01 percent for the endangered blue whale, 0.17 percent for the endangered sperm whale, and less than 2.5 percent of the other 15 mammal populations or stocks).

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the mitigation and monitoring measures, NMFS finds that L-DEO's planned research activities (and the resultant total taking from the marine geophysical survey): (1) will result in the incidental take of small numbers of marine mammals, by Level B harassment only; (2) will have a negligible impact on the affected species or stocks; and (3) will have mitigated impacts to affected species or stocks of marine mammals to the lowest level practicable.

#### Impact on Availability of Affected Species or Stock for Taking for Subsistence Uses

There are no relevant subsistence uses of marine mammals implicated by this action.

#### Endangered Species Act

Of the species of marine mammals that may occur in the survey area, six are listed as endangered under the ESA, including the humpback, sei, fin, blue, and sperm whales and the Hawaiian monk seal. However, L-DEO only requested Level B incidental harassment of two listed species: the humpback and sperm whales. L-DEO did not request take of endangered humpback, sei, or fin, whales because of the low likelihood of encountering these species during the cruise. Under section 7 of the ESA, NSF had initiated formal consultation with the NMFS, Office of Protected Resources, Endangered Species Act Interagency Cooperation Division, on this seismic survey. Because the actions of conducting the seismic survey and issuing the IHA are interrelated, NMFS' Office of Protected Resources, Permits and Conservation Division, had initiated formal consultation under section 7 of the ESA with NMFS' Office of Protected Resources, Endangered Species Act

Interagency Cooperation Division, to obtain a BiOp evaluating the effects of issuing the IHA on threatened and endangered marine mammals and, if appropriate, authorizing incidental take.

November, 2011 NMFS issued a BiOp and concluded that the action and issuance of the IHA are not likely to jeopardized the continued existence of the humpback and sperm whales. The BiOp also concluded that designated critical habitat for these species does not occur in the survey area and would not be affected by the survey. L-DEO must also comply with the Relevant Terms and Conditions of the Incidental Take Statement (ITS) corresponding to NMFS' Biological Opinion issued to both NSF and NMFS' Office of Protected Resources. L-DEO must also comply with the mitigation and monitoring requirements included in the IHA in order to be exempt under the ITS in the BiOp from the prohibition on take of listed endangered marine mammal species otherwise prohibited by Section 9 of the ESA.

National Environmental Policy Act (NEPA)

To meet NMFS' NEPA requirements for the issuance of an IHA to L-DEO, NMFS has prepared an Environmental Assessment (EA) titled "Issuance of an Incidental Harassment Authorization to the Lamont-Doherty Earth Observatory to Take Marine Mammals by Harassment Incidental to a Marine Geophysical Survey in the Central Pacific Ocean, November, 2011 through January, 2012." This EA incorporates the NSF's Environmental Analysis Pursuant To Executive Order 12114 (NSF, 2010) and an associated report (Report) prepared by LGL Limited Environmental Research Associates (LGL) for NSF, titled, "Environmental Assessment of a Marine Geophysical Survey by the R/V Marcus G. Langseth in the Central Pacific Ocean, November – December 2011," by reference pursuant to 40 CFR 1502.21 and NOAA Administrative Order (NAO) 216-6 § 5.09(d). NMFS provided relevant environmental information to the public through the notice for the proposed IHA (76 FR 57959, September 19, 2011) and has considered public comments received in



response prior to finalizing its EA and deciding whether or not to issue a Finding of No Significant Impact (FONSI).

NMFS has concluded that issuance of an IHA would not significantly affect the quality of the human environment and has issued a FONSI. Because the NMFS has made a FONSI, it is not necessary to prepare an environmental impact statement for the issuance of an IHA to L-DEO for this activity. The EA and FONSI for this activity are available upon request (see ADDRESSES).

#### Authorization

As a result of these determinations, NMFS has issued an IHA to L-DEO for the take of small numbers of marine mammals, by Level B harassment, incidental to conducting a marine geophysical survey in the central Pacific Ocean, November 2011 through January 2012, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated.

Dated: November 28, 2011

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